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ABSTRACT

This paper examines 10 principles of learning and suggests ways in which vocational education teachers may apply them in their classrooms. The following principles are discussed: reductionism, the law of effect, imitation and observational learning, classroom management without punishment, shaping, the law of primacy, token rewards, the law of exercise, the law of disuse, and oscillation of behavior. (MN)

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THE IDENTIFICATION OF TEN PRINCIPLES OF LEARNING AND THEIR APPLICATIONS TO VOCATIONAL EDUCATION

by

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LEARNING PRINCIPLES AND THEIR APPLICATIONS

Reductionism

Vocational education draws upon the principle of reductionism when developing instructional strategies. Subsuming empiricism, reductionism is defined by Bower and Hilgard (1981:2-3) as, "the thesis that all complex ideas are built up out of a basic stock of simple ideas, and that complex ideas are in turn reducible to these simple ideas." Reductionism, therefore, parallels the concept of molar (large-scale) and molecular (small-scale) behavior (Bower and Hilgard, 1981:327; Hill, 1977:136).

Recent advances in the quality and economics of videotaped recordings provides vocational instructors the opportunity to put the notion of reductionism into practice. Complex tasks, tasks that demand precise psychomotor skills, can be easily videotaped. Students can then observe, by use of slow-motion and freeze frame, how a complex terminal skill is actually a succession of simpler enabling skills. The benefit is that time, effort, and money are saved and safety is promoted.

The Law of Effect

Originally developed by Thorndike, the law of effect is described by Bigge (1982:53-54) as, "a response is

strengthened if it is followed by pleasure and weakened if followed by displeasure. Later, Thorndike placed greater emphasis on satisfiers and less emphasis on annoyers in recognition of the limitations of punishment (Hill, 1977:54-55). The law of effect brings to mind that "success breeds success" is more than a cliche (Magnesen, 1983:1).

Reinforcement is commonly used in education and "Thorndike's law of effect anticipates the reinforcement principle adopted in later conditioned response theories" (Bower and Hilgard, 1981:26). Classroom management regularly uses reinforcement as a means of promoting appropriate behavior and the recognition of the law of effect helped later learning theorists develop that technique.

Imitation and Observational Learning

The Miller-Dollard learning model identifies how learning, itself a learned behavior, is the process by which much human learning behavior proceeds (Hill, 1977:58). In the context of social learning, Bandura has identified four interrelated subprocesses of imitation: attentional process, retention process, motoric reproduction skills, and reinforcement (Bower and Hilgard, 1981:464-466).

Assuming the responsibility of providing students a role-model, teachers promote imitation and observational learning. Planned teaching strategies enhance imitation, and Bandura's subprocesses of observational learning are closely paralleled by Gagne and Briggs' (1979:166) model of

instructional events. From gaining attention to enhancing retention and transfer, the teacher elicits imitative responses by providing the role model for proper behavior.

Classroom Management Without Punishment

Punishment is viewed as either the presentation of a negative stimulus or the removal of a positive stimulus as an attempt to weaken a response (Bigge, 1982:122-123). Although punishment can be used to either suppress behavior or provide a cue (Hulse, Egeth, and Deese, 1980:158-159), behaviorists tend to view punishment as either ineffective and/or undesirable (Brower and Hilgard, 1981:292).

Classroom management can promote learning without the use of punishment if teachers are: well trained in the use of non-punitive group management; self-controlled, and; in receipt of administrative support until goals reach fruition. Behavior modification and similar techniques allow the reinforcement of appropriate behaviors and, by carefully avoiding sustenance to inappropriate behaviors, undesirable behaviors will eventually be extinguished.

Shaping

Shaping is defined as, "teaching a novel response by reinforcing closer and closer approximations to that behavior" (Hill, 1977:279). The reinforcement of successive approximations of terminal behavior allows the elicitation of previously unobtainable behavior.

The development of learning hierarchies was made possible through application of the notion of shaping. Gagne and Briggs (1979) and the United States Department of Labor (Dictionary of Occupational Titles, 1977) incorporate designs for vocational educators to present "training progression from simple to complex, from a single behavioral unit to a sequence of units" (Brower and Hilgard, 1981:539). These hierarchies incorporate success (reinforcement) with enabling objectives as the means of achieving terminal behavior.

The Law of Primacy

Primacy is documented when, during recall of previously memorized word lists, subjects "recall more words from the beginning of the list" (Hulse, Egeth, and Deese, 1980:287). Magnesen (1983:1) stated, "first impressions are vital and lasting ones" to describe primacy.

Planned instruction uses primacy when, by design, the first teaching events are to gain attention, inform learners of objectives, and stimulate recall of prerequisites (Gagne and Briggs, 1979:166). Such strategies "enhance accuracy of the first few serial positions" (Hulse, Egeth, aad Deese, 1980:342), promoting the outcomes of instruction. Additionally, the instructional model offered by Gagne and Briggs not only enhances instruction by recognition of primacy, but if properly followed, the model would help "flatten" the U-shaped primacy, asymptote, and recency curve.

Token Rewards

Token rewards are described as "a form of behavior modification in which the desired behavior is reinforced with some form of symbolic reward (functioning as a conditioned reinforcer) which can be traded for primary reinforcers" (Hill, 1977:280). When tokens are "given immediately for proper behavior", they avoid delays in primary reinforcement (Hulse, Egeth, and Deese, 1980:57). Although detracted by those who claim that tokens are merely bribes, tokens of various forms (i.e., marbles immediately for later rewards such as a soft drink) have a documentation of contributing to effective classroom management and the learning process.

The Law of Exercise

Thorndike stated the law of effect as "other things being equal, exercise strengthens the bond between situation and response" (Bigge, 1982:53). Magnesen (1983:1) additionally stated, "the more an act is repeated, the more quickly the habit will be established."

The law of exercise is not to be equated to the adage "practice makes perfect". Thorndike, in later reflection of the law of exercise, recognized the need to incorporate the idea of "rewarded correct use" (Bower and Hilgard, 1981:27). Incorporating "rewarded correct use", a teacher can employ the law of exercise by periodically calling upon students, by use of tests or other means, to recall prior learning and to then reward only correct behavior.

The Law of Disuse

Presented as a theory of forgetting is the notion that disuse causes forgetting (Hulse, Egeth, and Deese, 1980: 302). Magnesen (1983:1) specifically addressed the law of disuse by stating, "skills not practiced and knowledge not used are largely forgotten." Hulse, Egeth, and Deese (1980: 304) conclude that although "disuse theory is inadequate as a complete explanation of forgetting", it is not suggested that "disuse accounts for no forgetting at all."

A teacher can use repetition as a means of counteracting the harmful outcomes of disuse. Magnesen (1983:1) suggests that, because "the period immediately following initial learning is one of the most important in final retention", learning will be promoted if students can be guided to practice the effective study habit of immediately recapitulating instruction. Gagne and Briggs (1979:166) promote that practice when they suggest that a corollary to the instructional event of enhancing retention and transfer is that instructors should "provide spaced reviews including a variety of examples" as an attempt to reduce disuse.

Oscillation of Behavior

Oscillation is based upon the Hullian paradigm of mathematical prediction of behavior by use of postulates and corollaries and is defined as, "momentary random fluctuations in excitatory potential" (Hill, 1977:278). Oscillation refers to the notion that "any given amount of excitatory

potential is not an exact value but the average of a random distribution of values (Hill, 1977:71).

Teachers must recognize that, because a measured value is actually "the average of a random distribution of values", tests scores and similar measures are not concrete, but are instead an indicator of a range of performance. Accordingly, professional educators must assess student test performance as a range extending "one standard error of measurement above and below the pupil's obtained scores" (Gronlund, 1981:388). McClelland (1973) and others have cautioned educators against the misuse and overuse of test scores.

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